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PATENT
5589-05001/P1032**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**In re Application of:
Xu et al.

Serial No. 10/699,352

Filed: October 31, 2003

For: METHODS AND SYSTEMS FOR
DETERMINING AN ELECTRICAL
PROPERTY OF AN INSULATING
FILM

Group Art Unit: 2829

Examiner: Hollington, Jermele M.

Atty. Dkt. No. 5589-05001

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6-13-05
DatePamela Gerik
Pamela Gerik**RESPONSE TO OFFICE ACTION MAILED MARCH 11, 2005**

MS: Non-Fec Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

This paper is submitted in response to the Office Action mailed March 11, 2005 to further
highlight reasons why the application is in condition for allowance.

Remarks begin on page 2 of this paper.

REMARKS

Claims 1-20 are pending in the case. Further examination and reconsideration of pending claims 1-20 are respectfully requested.

Section 102 Rejections

Claims 1-2, 5, 8, 10, 13-15, and 17-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,202,029 to Verkuil et al. (hereinafter "Verkuil"). As will be set forth in more detail below, the § 102 rejections of claims 1-2, 5, 8, 10, 13-15, and 17-20 are respectfully traversed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP § 2131. The cited art does not disclose all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

The cited art does not teach determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film. Independent claim 1 recites in part: "depositing a charge on an upper surface of the insulating film; measuring a current to the wafer during said depositing; and determining the surface voltage of the insulating film from the current." Independent claims 14 and 19 recite similar limitations.

Verkuil discloses non-contact electrical conduction measurements for insulating films. Verkuil, however, does not disclose determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film. For example, Verkuil states that "Current flowing through the wafer 15 from the corona gun 18 is converted to a voltage by the current to voltage converter 24. This voltage (current) is integrated by the charge integrator 26 to provide a measure of the charge deposited by the corona gun 18 on the oxide 12." (Verkuil -- col. 2, line 65 to col. 3, line 3). Therefore, Verkuil teaches determining the charge deposited on the oxide from the measured current. Verkuil also states that "The V-I graphs in FIGS. 2 and 3 can be used to identify the oxide voltage or electric field at a given conduction current." (Verkuil -- col. 4, lines 39-41). Therefore, Verkuil teaches determining a voltage across the oxide (not a surface voltage) from the V-I graphs. As such, although Verkuil uses the current measurements to determine the amount of charge deposited on the wafer and the

voltage across the oxide, Verkuil does not teach determining a surface voltage of an insulating film from a current measurement. Instead, Verkuil states that "Movement of the probe 20 above a charged surface results in an AC voltage representative of the potential of the charged surface. The Kelvin control 22 converts the AC voltage to a signal corresponding to the voltage of the surface." (Verkuil -- col. 2, lines 60-64). Therefore, Verkuil teaches determining a surface voltage of an insulating film from movement of a Kelvin probe above the charged surface of the insulating film. As such, Verkuil does not teach determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film, as recited in claims 1, 14, and 19. Therefore, Verkuil does not teach all limitations of claims 1, 14, and 19.

For at least the reasons set forth above, independent claims 1, 14, and 19, as well as claims dependent therefrom, are not anticipated by the cited art. Accordingly, removal of the § 102 rejections of claims 1-2, 5, 8, 10, 13-15, and 17-20 is respectfully requested.

Section 103(a) Rejections

Claims 6-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Verkuil in view of IBM Technical Disclosure Bulletin, Vol. 32, No. 9A, 1990, pp. 14-17 (hereinafter "IBM"). As will be set forth in more detail below, the § 103 rejections of claims 6-7 are respectfully traversed.

To establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond*, 910 F.2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). The cited art does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

The cited art does not teach or suggest determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film, as recited in claim 1. For at least the reasons set forth above, Verkuil does not teach all limitations of claim 1. In addition, for at least the reasons set forth above, Verkuil does not suggest all

limitations of claim 1. Furthermore, IBM cannot be combined with Verkuil to overcome deficiencies contained therein.

In particular, IBM discloses a contactless photovoltage vs. bias method for determining flat-band voltage. IBM, however, does not disclose determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film. For example, IBM states that "a transparent metallic electrode pickup plate 12 is located above the oxide surface 2. The plate is connected to an ultra-high input impedance metal oxide semiconductor field-effect transistor (MOSFET) 13. A mechanical vibrator 14 sets the electrode into motion, and V_s is determined as the value of null bias supply voltage 15 required to null the resultant AC signal at the output of the MOSFET buffer." (IBM -- p. 16). Therefore, IBM, like Verkuil, discloses determining a surface voltage of an insulating film from vibration of a probe. As such, IBM, like Verkuil, does not disclose determining a surface voltage from a current measurement. As a result, IBM does not teach or suggest determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film, as recited in claim 1. Consequently, IBM does not teach or suggest all limitations of claim 1 and cannot be combined with Verkuil to overcome deficiencies contained therein.

For at least the reasons stated above, independent claim 1, as well as claims 6-7, which are dependent therefrom, are patentably distinct over the cited art. Accordingly, removal of the § 103 rejections of claims 6-7 is respectfully requested.

Allowable Subject Matter

Claims 3-4, 9, 11-12, and 16 were objected to as being dependent upon a rejected base claim, but were deemed allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant appreciates the Examiner's indication of allowable subject matter and awaits allowance of the remaining claims in the case.

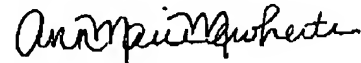
CONCLUSION

This response constitutes a complete response to all issues raised in the Office Action mailed March 11, 2005. In addition, the art cited but not relied upon is not believed to be pertinent to the patentability of the present claims. In view of the remarks presented herein, Applicants assert that pending

claims 1-20 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

The Commissioner is authorized to charge any fees, which may be required, or credit any overpayment, to deposit account number 50-3268/5589-05001.

Respectfully submitted,



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